Appendix A: Emissions Calculations
Summary of Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Potential to Emit Before Controls (ton\yr)

	Significant Emission Units	**PM** (tons/yr)	**PM10** (tons/yr)	**PM2.5** (tons/yr)	**SO2** (tons/yr)	**NOx** (tons/yr)	**VOC** (tons/yr)	**CO** (tons/yr)	**GHG** (tons/yr)	**GHG** (tons/yr)	**Total HAPs** (tons/yr)
									10/30/2009	11/29/2013	
14	One (1) pneumatic conveyor, identified as EU-11	189.2	189.2	16.1	-	-	-	-	-	-	-
15	One (1) corn receiving and storage system, identified as EU-12 (Stack S-111)	225.3	225.3	19.1	-	-	-	-	-	-	-
16	One (1) grain transport system, identified as EU-12 (Stack S-112)	20.3	20.3	1.73	-	-	-	-	-	-	-
17	Seven (7) storage bins, collectively identified as EU-13	20.3	20.3	1.73	-	-	-	-	-	-	-
18	Six (6) hammermills, collectively identified as EU-14	90.1	90.1	7.66	-	-	-	-	-	-	-
19	EU-21, which consists of fourteen (14) open fermenters	-	-	-	-	-	7.8	-	-	-	0.04
20	DDGS Storage (EU-34)	29.8	29.8	2.5	-	-	-	-	-	-	-
21	DDGS Rail/Truck Loadout (EU-35/EU-36)	27.2	27.2	2.3	-	-	-	-	-	-	-
22	DDGS Rail/Truck Loader(EU-37/EU-38)	0.27	0.27	0.05	-	-	-	-	-	-	-
23	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	-	-	-	57.8	-	-	-	0.26
24	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	12.5	-	-	-	-
25	Distillation (EU-20 and EU-25 through EU-29)	-	-	-	-	-	0.1	-	-	-	3.43E-03
26	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	-	-	-	440.0	-	-	-	2.00
27	Five (5) rotary dryers, one (1) cooler, and one (1) transport system, collectively identified as EU-32	201.0	201.0	201.0	-	-	893.4	-	-	-	69.9
28	One (1) wine room, identified as EU-41	-	-	-	-	-	19.5	-	-	-	-
29	One (1) tank farm, identified as EU-42	-	-	-	-	-	19.0	-	-	-	-
30	EU-43, which consists of Building 88	-	-	-	-	-	4.7	-	-	-	-
31	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	3.6	-	-	-	-
32	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	12.0	-	-	-	-
33	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	1867.4	-	-	-	-
34	One (1) steam boiler, identified as EU-96	1.99	7.96	7.96	0.63	293.4	5.76	88.0	126,497	126,479	1.98
35	One (1) steam boiler, identified as EU-97 (worst case fuel)	2.85	3.28	2.21	60.8	28.5	1.12	17.2	31,930	31,926	0.39
36	One (1) loading rack, identified as EU-46	-	-	-	-	-	6.69	-	-		0.05
37	**Subtotal Significant Emission Unit**	**808**	**815**	**262**	**61**	**322**	**3351**	**105**	**158427**	**158405**	**75**
38	**Fugitive Emissions**	-	-	-	-	-	**128.2**	-	-		**0.90**
39	Emergency Generator-Diesel	0.280	0.160	0.160	1.62	9.60	0.28	2.20	462	462	4.41E-03
40	Emergency Generator-Natural gas	0.001	0.001	0.001	1.78E-05	0.10	0.004	0.01	4.14	4.29	2.38E-03
41	FW Pump-Diesel	0.13	0.13	0.13	0.12	1.82	0.15	0.39	67.8	67.8	1.59E-03
42	**Subtotal Insignificant Activities**	**0.41**	**0.29**	**0.29**	**1.74**	**11.5**	**0.43**	**2.60**	**533**	**534**	**8.38E-03**
43	**Total**	**809**	**815**	**263**	**63**	**333**	**3480**	**108**	**158961**	**158939**	**76**

Appendix A: Emissions Calculations
Summary of Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Potential to Emit After Control (ton\yr)

	Significant Emission Units	**PM** (tons/yr)	**PM10** (tons/yr)	**PM2.5** (tons/yr)	**SO2** (tons/yr)	**NOx** (tons/yr)	**VOC** (tons/yr)	**CO** (tons/yr)	**GHG** (tons/yr)	**GHG** (tons/yr)	**Total HAPs** (tons/yr)
									10/30/2009	11/29/2013	
58	One (1) pneumatic conveyor, identified as EU-11	1.89	1.89	0.32	-	-	-	-	-	-	-
59	One (1) corn receiving and storage system, identified as EU-12 (Stack S-111)	2.25	2.25	0.38	-	-	-	-	-	-	-
60	One (1) grain transport system, identified as EU-12 (Stack S-112)	0.20	0.20	0.03	-	-	-	-	-	-	-
61	Seven (7) storage bins, collectively identified as EU-13	0.20	0.20	0.03	-	-	-	-	-	-	-
62	Six (6) hammermills, collectively identified as EU-14	0.90	0.90	0.15	-	-	-	-	-	-	-
63	EU-21, which consists of fourteen (14) open fermenters	-	-	-	-	-	7.8	-	-	-	0.04
64	DDGS Storage (EU-34)	0.30	0.30	0.05	-	-	-	-	-	-	-
65	DDGS Rail/Truck Loadout (EU-35/EU-36)	0.27	0.27	0.05	-	-	-	-	-	-	-
66	DDGS Rail/Truck Loader(EU-37/EU-38)	0.27	0.27	0.05	-	-	-	-	-	-	-
67	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	-	-	-	57.8	-	-	-	0.26
68	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	12.5			-	
69	Distillation (EU-20 and EU-25 through EU-29)	-	-	-	-	-	0.1	-	-	-	3.43E-03
70	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	-	-	-	440.0	-	-	-	2.00
71	Five (5) rotary dryers, one (1) cooler, and one (1) transport system, collectively identified as EU-32	30.2	30.2	30.2	-	-	893.4	-	-	-	69.9
72	One (1) wine room, identified as EU-41	-	-	-	-	-	19.5	-	-	-	-
73	One (1) tank farm, identified as EU-42	-	-	-	-	-	19.0	-	-	-	-
74	EU-43, which consists of Building 88	-	-	-	-	-	4.69	-	-	-	-
75	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	3.59	-	-	-	-
76	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	12.0	-	-	-	-
77	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	1867	-	-	-	-
78	One (1) steam boiler, identified as EU-96	1.99	7.96	7.96	0.63	293.4	5.76	88.0	126,497	126,479	1.98
79	One (1) steam boiler, identified as EU-97 (worst case fuel)	2.85	3.28	2.21	60.8	28.53	1.12	17.2	31,930	31,926	0.39
80	One (1) loading rack, identified as EU-46	-	-	-	-	-	6.69	-	-		0.05
81	**Subtotal Significant Emission Unit**	**41**	**48**	**41**	**61**	**322**	**3,351**	**105**	**158,427**	**158,405**	**75**
82	**Fugitive Emissions**	**-**	**-**	**-**	**-**	**-**	**128.2**	**-**	**-**		**0.90**
83	Emergency Generator-Diesel	0.28	0.16	0.16	1.62	9.60	0.28	2.20	462	462	4.41E-03
84	Emergency Generator-Natural gas	0.001	0.001	0.001	0.000	0.096	0.004	0.012	4.14	4.29	2.38E-03
85	FW Pump-Diesel	0.13	0.13	0.13	0.12	1.82	0.15	0.39	67.8	67.8	1.59E-03
86	**Subtotal Insignificant Activities**	**0.41**	**0.29**	**0.29**	**1.74**	**11.52**	**0.43**	**2.60**	**533**	**534**	**8.38E-03**
87	**Total**	**42**	**48**	**42**	**63**	**333**	**3,480**	**108**	**158,961**	**158,939**	**76**

Appendix A: Emissions Calculations
Summary of Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

	A	B	C	D	E	F	G	H	I	J	K
98	**Potential to Emit After Issuance of Permit (Limited PTE) (ton\yr)**										
99	***Significant Emission Units***	**PM**	**PM10**	**PM2.5**	**SO2**	**NOx**	**VOC**	**CO**	**GHG**	**GHG**	**Total HAPs**
100		(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)	(tons/yr)
101									10/30/2009	11/29/2013	
102	One (1) pneumatic conveyor, identified as EU-11	189.2	189.2	16.1	-	-	-	-	-	-	-
103	One (1) corn receiving and storage system, identified as EU-12 (Stack S-111)	5.26	5.26	5.26	-	-	-	-	-	-	-
104	One (1) grain transport system, identified as EU-12 (Stack S-112)	0.96	0.96	0.96	-	-	-	-	-	-	-
105	Seven (7) storage bins, collectively identified as EU-13	0.20	0.20	0.03	-	-	-	-	-	-	-
106	Six (6) hammermills, collectively identified as EU-14	90.1	90.1	7.66	-	-	-	-	-	-	-
107	EU-21, which consists of fourteen (14) open fermenters	-	-	-	-	-	7.8	-	-	-	0.04
108	DDGS Storage (EU-34)	0.60	0.60	0.60	-	-	-	-	-	-	-
109	DDGS Rail/Truck Loadout (EU-35/EU-36)	1.27	1.27	1.27	-	-	-	-	-	-	-
110	DDGS Rail/Truck Loader(EU-37/EU-38)	5.48	5.48	5.48	-	-	-	-	-	-	-
111	Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	-	-	-	57.8	-	-	-	0.26
112	Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	12.5	-	-	-	-
113	Distillation (EU-20 and EU-25 through EU-29)	-	-	-	-	-	0.1	-	-	-	0.00
114	Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	-	-	-	440.0	-	-	-	2.00
115	Five (5) rotary dryers, one (1) cooler, and one (1) transport system, collectively identified as EU-32	201.0	201.0	201.0	-	-	893.4	-	-	-	69.9
116	One (1) wine room, identified as EU-41	-	-	-	-	-	19.5	-	-	-	-
117	One (1) tank farm, identified as EU-42	-	-	-	-	-	19.0	-	-	-	-
118	EU-43, which consists of Building 88	-	-	-	-	-	4.69	-	-	-	-
119	One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	3.59	-	-	-	-
120	One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	12.0	-	-	-	-
121	Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	1,867	-	-	-	-
122	One (1) steam boiler, identified as EU-96	1.99	7.96	7.96	0.63	293.4	5.76	88.0	126,497	126,479	1.98
123	One (1) steam boiler, identified as EU-97 (worst case fuel)	1.98	2.65	1.96	39.4	25.4	0.56	10.42	31,930	31,926	0.39
124	One (1) loading rack, identified as EU-46	-	-	-	-	-	6.69	-	-	-	0.05
125	**Subtotal Significant Emission Unit**	**498**	**505**	**248**	**40**	**319**	**3,351**	**98**	**158,427**	**158,405**	**75**
126	**Fugitive Emissions**	**-**	**-**	**-**	**-**	**-**	**128.2**	**-**	**-**	**-**	**0.90**
127	Emergency Generator-Diesel	0.28	0.16	0.16	1.62	9.60	0.28	2.20	462	462	4.41E-03
128	Emergency Generator-Natural gas	0.001	0.001	0.001	0.000	0.096	0.004	0.012	4.14	4.29	2.38E-03
129	FW Pump-Diesel	0.13	0.13	0.13	0.12	1.82	0.15	0.39	67.8	67.8	1.59E-03
130	**Subtotal Insignificant Activities**	**0.41**	**0.29**	**0.29**	**1.74**	**11.5**	**0.43**	**2.60**	**533**	**534**	**8.38E-03**
131	**Total**	**498**	**505**	**249**	**42**	**330**	**3,480**	**101**	**158,961**	**158,939**	**76**

Appendix A: Emissions Calculations
Summary of HAP Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Significant Emission Units	Benzene ton/yr	Dichlorobenzene ton/yr	Formaldehyde ton/yr	Hexane ton/yr	Toluene ton/yr	Lead ton/yr	Cadmium ton/yr	Chromium ton/yr	Manganese ton/yr	Nickel ton/yr	Acetaldehyde ton/yr	Propionaldehyde ton/yr	Methanol ton/yr	Acrolein ton/yr	PAH ton/yr	1,3-Butadiene ton/yr	Xylene ton/yr	Total HAP ton/yr
One (1) pneumatic conveyor, identified as EU-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
One (1) corn receiving and storage system, identified as EU-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Seven (7) storage bins, collectively identified as EU-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Six (6) hammermills, collectively identified as EU-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
EU-21, which consists of fourteen (14) open fermenters	-	-	1.04E-03	-	-	-	-	-	-	-	0.03	2.09E-03	1.04E-03	-	-	-	-	0.04
Silos, surge hopper, and transport system: EU-34 through EU-36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Twenty-four (24) closed fermenters, collectively identified as EU-22	-	-	7.69E-03	-	-	-	-	-	-	-	0.23	1.54E-02	7.69E-03	-	-	-	-	0.26
Two (2) beer wells, identified as EU-23 and EU-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Distillation (EU-20 and EU-25 through EU-29)	-	-	2.04E-04	-	-	-	-	-	-	-	2.81E-03	2.04E-04	2.04E-04	-	-	-	-	3.43E-03
Four (4) paddle screens, identified as EU-31 and three (3) conveyors, identified as EU-33	-	-	5.84E-02	-	-	-	-	-	-	-	1.77	1.17E-01	5.84E-02	-	-	-	-	2.00
Five (5) rotary dryers, one (1) cooler, and one (1) transport system, collectively identified as EU-32	-	-	0.32	-	-	-	-	-	-	-	55.2	-	11.05	3.28	-	-	-	69.9
One (1) rail car loader and one (1) truck loader, identified as EU-37 and EU-38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
One (1) wine room, identified as EU-41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
One (1) tank farm, identified as EU-42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
EU-43, which consists of Building 88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
One (1) mini-tank farm, identified as EU-45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
One (1) barrel and emptying operation, identified as EU-61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Six (6) warehouses, identified as EU-71 through EU-76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
One (1) steam boiler, identified as EU-96	2.20E-03	1.26E-03	7.86E-02	1.89E+00	3.56E-03	5.24E-04	1.15E-03	1.47E-03	3.98E-04	2.20E-03	-	-	-	-	-	-	-	1.98
One (1) steam boiler, identified as EU-97 (worst case fuel)	4.29E-04	2.45E-04	1.53E-02	3.68E-01	6.95E-04	1.80E-03	5.99E-04	5.99E-04	1.20E-03	5.99E-04	-	-	-	-	-	-	-	0.39
One (1) loading rack, identified as EU-46	-	-	6.69E-03	-	-	-	-	-	-	-	6.69E-03	-	3.34E-02	-	-	-	-	0.05
Fugitive Emissions	-	-	1.28E-01	-	-	-	-	-	-	-	1.28E-01	-	6.41E-01	-	-	-	-	0.90
Subtotal Significant Emission Unit	**2.63E-03**	**1.50E-03**	**0.62**	**2.25**	**4.26E-03**	**2.32E-03**	**1.75E-03**	**2.07E-03**	**1.60E-03**	**2.80E-03**	**57.4**	**0.14**	**11.80**	**3.28**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**75.5**
Emergency Generator-Diesel	2.17E-03	-	2.21E-04	-	7.87E-04	-	-	-	-	-	7.06E-05	-	-	2.21E-05	5.94E-04	-	5.40E-04	4.41E-03
Emergency Generator-Natural gas	5.87E-05	-	1.67E-03	1.35E-05	-	-	-	-	-	-	2.35E-04	-	7.50E-05	2.35E-04	4.05E-06	2.48E-05	-	2.32E-03
FW Pump-Diesel	3.84E-04	-	4.85E-04	-	1.68E-04	-	-	-	-	-	3.15E-04	-	-	3.80E-05	6.91E-05	-	1.17E-04	1.58E-03
Subtotal Insignificant Activities	**2.62E-03**	**0.00E+00**	**2.38E-03**	**1.35E-05**	**9.55E-04**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**6.21E-04**	**0.00E+00**	**7.50E-05**	**2.95E-04**	**6.67E-04**	**2.48E-05**	**6.58E-04**	**0.01**
Total	**5.24E-03**	**1.50E-03**	**0.62**	**2.25**	**5.21E-03**	**2.32E-03**	**1.75E-03**	**2.07E-03**	**1.60E-03**	**2.80E-03**	**57.4**	**0.14**	**11.8**	**3.28**	**6.67E-04**	**2.48E-05**	**6.58E-04**	**75.5**

	A	B	C	D	E	F	G	H
10	Stack ID	Process Description	Control Device	Outlet Grain Loading (gr/dscf)	Maximum Air Flow Rate (scfm)	PTE of PM/PM10 after Control* (lb/hr)	PTE of PM/PM10 after Control (ton/yr)	PTE of PM2.5 after Control** (lb/hr)
11	S-103	Grain Receiving and pneumatic conveyor EU-11	Baghouse	0.004	12,600	0.43	1.89	0.07
12	S-111	Corn Receiving and storage system EU-12	Baghouse	0.004	15,000	0.51	2.25	0.09
13	S-112	Grain Transport system EU-12	Baghouse	0.004	1,354	0.05	0.20	0.01
14	inside	Storage: (7) Grain Storage Silos (EU-13)	Baghouse	0.004	1,354	0.05	0.20	0.01
15	S-104	(6) Hammermills and hopper (EU-14)	Baghouse	0.004	6,000	0.21	0.90	0.03
16		**DDGS Storage (EU-34)**						
17	S-341	Storage silo	Baghouse	0.004	905	0.03	0.14	0.01
18	S-342	Storage silo	Baghouse	0.004	905	0.03	0.14	0.01
19	S-343	Surge Hopper	Baghouse	0.004	86	0.00	0.01	0.00
20	S-344	Surge Hopper	Baghouse	0.004	86	0.00	0.01	0.00
21	S-350	DDGS Rail Loadout (EU-35)	Baghouse	0.004	905	0.03	0.14	0.01
22	S-360	DDGS Truck Loadout (EU-36)	Baghouse	0.004	905	0.03	0.14	0.01
23	S-370	DDGS Rail Car Loader (EU-37)	None	0.004	905	0.03	0.14	0.01
24	S-380	DDGS Truck Loader (EU-38)	None	0.004	905	0.03	0.14	0.01
25	**Total**					**1.4**	**6.3**	**0.2**

*Assume all PM emissions equal PM10 emissions.

** Assume controlled PM2.5 emissions equal 17% PM/PM10 emissions (AP-42 Table 9.9.1-1 Reference 40).

Methodology:

outlet grain loading (gr/dscf) provided by source with maximum air flow rate (scfm)

PTE of PM/PM10 after Control (lb/hr) = Outlet Grain Loading (gr/dscf) x Max. Air Flow Rate (scfm) x (60 min/hr) x (1 lb/7000 gr)

PTE of PM/PM10 after Control (ton/yr) = Outlet Grain Loading (gr/dscf) x Max. Air Flow Rate (scfm) x (60 min/hr) x (1 lb/7000 gr) x (8760 hr/yr) x (1 ton/2000 lb)

PTE before Control (ton/yr) = PTE after Control (ton/yr) / (1-Control Efficiency)

PM2.5 Control Efficiency is assumed to be less than the PM/PM10 Control Efficiency.

Appendix A: Emissions Calculations
Grain Handling

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

PTE of PM2.5 after Control (ton/yr)	PM/PM10 Control Efficiency	PM2.5 Control Efficiency	PTE of PM/PM10 before Control (ton/yr)	PTE of PM2.5 before Control (ton/yr)	Limited PTE PM (lb/hr)	Limited PTE PM10 (lb/hr)	Limited PTE PM2.5 (lb/hr)	Limited PTE PM (ton/yr)	Limited PTE PM10 (ton/yr)	Limited PTE PM2.5 (ton/yr)
0.32	99%	98%	189.2	16.1						
0.38	99%	98%	225.3	19.1	1.20	1.20	1.20	5.26	5.26	5.26
0.03	99%	98%	20.3	1.73	0.219	0.219	0.219	0.96	0.96	0.96
0.03	99%	98%	20.3	1.73						
0.15	99%	98%	90.1	7.66						
0.02	99%	98%	13.6	1.16	0.136	0.136	0.136	0.60	0.60	0.60
0.02	99%	98%	13.6	1.16						
0.00	99%	98%	1.3	0.11						
0.00	99%	98%	1.3	0.11						
0.02	99%	98%	13.6	1.16	0.289	0.289	0.289	1.27	1.27	1.27
0.02	99%	98%	13.6	1.16						
0.02	0%	0%	0.14	0.02	1.25	1.25	1.25	5.48	5.48	5.48
0.02	0%	0%	0.14	0.02						
1.1	**10.9**	**10.8**	**602.5**	**51.2**	**3.1**	**3.1**	**3.1**	**13.6**	**13.6**	**13.6**

Appendix A: Emissions Calculations
VOC Emissions from Distillation and Beer Wells

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrencebu
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Wi
Date: May 22, 2014

EU-20, 25-29 Distillation

Potential to Emit (PTE) of VOC:

Maximum Usage (gal/hr)	VOC Emission Factor (lb/1000 gal)	VOC Emission rate (lb/hr)	VOC Emission rate (ton/yr)
31,221	0.000679	0.02	0.1

Methodology:

Emission factor is based on facility information and furnished by source.
Emission Rate (lb/hr) = Usage (gal/hr)/1,000 x EF (lb/1,000 gal)
Emission Rate (ton/yr) = Emission Rate (lb/hr) x 8,760 hr/yr / 2,000 lb/ton

EU-20, EU25- EU-29 Distillation Operations

VOC (lb/hr) = 0.02

	Distillation	
Uncontrolled PTE	**lb HAPs/lb VOC**	**ton/yr**
Acetaldehyde	3.03E-02	2.81E-03
Propionaldehyde	2.20E-03	2.04E-04
Methanol	2.20E-03	2.04E-04
Formaldehyde	2.20E-03	2.04E-04
Total Uncontrolled HAP		**3.43E-03**

Methodology:

lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003
HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)

EU-23 and EU-24 Beer Wells #3 and #1

Maximum Usage 1,050 1,000 bu/hr

Pollutant	Emission Factor (lb/1,000 bu)	VOC Emission rate (lb/yr)	VOC Emission rate (ton/yr)
VOC	2.72	2.86	12.5

Methodology:

Emission factor is based on facility information and furnished by source.
Emission rate (lb/hr) = Maximum usage (1,000 bu/hr) x EF (lb / 1,000 bu)
Emission Rate (lb/hr) = Emission Rate (ton/yr) x 2,000 lb/ton / 8,760 hr/yr

Appendix A: Emissions Calculations

VOC Emissions from Open and Closed Fermentation

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrencebu
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Wi
Date: May 22, 2014

EU-21 Open Fermentation

Potential to Emit (PTE) of VOC from Open Fermentation:

Maximum Usage 1,095,000 bu/yr

Pollutant	Emission Factor (lb/1,000 bu)	VOC Emission rate (lb/yr)	VOC Emission rate (ton/yr)
Ethanol	14.2	15,549	7.77
Ethyl Acetate	0.046	50	0.03
Isoamyl Alcohol	0.013	14	0.007
Isobutyl Alcohol	0.004	4	0.002
Total VOC	14.3		7.81

Methodology:

Emission Factors taken from AP-42, Table 9.12.3-1
Emission Rate (ton/yr) = Usage (bu/yr)/1,000 x Emission Factor (lb/1,000 bu) / 2,000 lb/ton
Emission Rate (lb/hr) = Emission Rate (ton/yr) x 2,000 lb/ton / 8,760 hr/yr

Potential to Emit (PTE) of HAP from Open Fermentation:

VOC (lb/hr) = 1.78

	Open Fermentation	
Uncontrolled PTE	**lb HAPs/lb VOC**	**ton/yr**
Acetaldehyde	4.02E-03	3.14E-02
Propionaldehyde	2.67E-04	2.09E-03
Methanol	1.33E-04	1.04E-03
Formaldehyde	1.33E-04	1.04E-03
Total Uncontrolled HAP		**0.04**

Methodology:

lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003
HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)

EU-22 Closed Fermentation

Potential to Emit (PTE) of VOC Closed Fermentation:

Maximum Usage 8,103,000 bu/yr

Pollutant	Emission Factor (lb/1,000 bu)	VOC Emission rate (lb/yr)	VOC Emission rate (ton/yr)
Ethanol	14.2	115,063	57.53
Ethyl Acetate	0.046	373	0.19
Isoamyl Alcohol	0.013	105	0.05
Isobutyl Alcohol	0.004	32	0.02
Uncontrolled VOC	**14.263**		**57.8**

	A	B	C	D	E
104	**Methodology:**				
105		Emission Factors taken from AP-42, Table 9.12.3-1			
106		Emission Rate (ton/yr) = Usage (bu/yr)/1,000 x Emission Factor (lb/1,000 bu) / 2,000 lb/ton			
107		Emission Rate (lb/hr) = Emission Rate (ton/yr) x 2,000 lb/ton / 8,760 hr/yr			
108					
109		**Potential to Emit (PTE) of HAP from Closed Fermentation:**			
110					
111			**VOC (lb/hr)**	**=**	**13.19**
112					
113				Closed Fermentation	
114		**Uncontrolled PTE**	**lb HAPs/lb VOC**	**ton/yr**	
115		Acetaldehyde	4.02E-03	2.32E-01	
116		Propionaldehyde	2.67E-04	1.54E-02	
117		Methanol	1.33E-04	7.69E-03	
118		Formaldehyde	1.33E-04	7.69E-03	
119		**Total Uncontrolled HAP**		**0.26**	
120					
121	**Methodology:**				
122		lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003			
123		HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)			

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VOC Emission rate (lb/hr)
1.78
0.006
0.002
0.0005
1.78

VOC Emission rate (lb/hr)
13.14
0.04
0.01
0.004
13.2

	F	G	H
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Appendix A: Emissions Calculations
Summary of Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

EU-31 and EU-33 Paddle Screens/ Conveyors

Source	Max Usage (gal/hr)	VOC Emission Factor* (lb/1,000 gal)	VOC Emission rate (lb/hr)	VOC Emission rate (ton/yr)
Spirits System	20,859	3.4	70.92	311
Whisky System	4,319	6.8	29.37	129
		Total:	**100**	**440**

Methodology:

Emission Rate = Maximum Usage (gal/hr)/1,000 x VOC Emission factor (lb/1,000 gal)
* Spirits System analysis of stillage based on 0.05% alcohol concentration.
*Whisky System analysis of stillage based on 0.1% alcohol concentration.

VOC (lb/hr) = 100.29

	Stillage	
Uncontrolled PTE	**lb HAPs/lb VOC**	**ton/yr**
Acetaldehyde	4.02E-03	1.77
Propionaldehyde	2.67E-04	1.17E-01
Methanol	1.33E-04	5.84E-02
Formaldehyde	1.33E-04	5.84E-02
Total Uncontrolled HAP		**2.00**

Methodology:

lb HAPs/lb VOC emission factors are from uncontrolled distillation in Permit No. T133-31145-00003 and derived from the mash scrubber emissions
HAP (ton/yr) = E.F. (lb HAPs/lb VOC) x VOC (lb/hr) x 8760 (hrs/yr) x 1/2000 (ton/lb)

Appendix A: Emissions Calculations
Five (5) rotary dryers, one (1) cooler and one (1) transport system

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

EU-32 Rotary Dryers

Maximum Usage: 25.5 ton/hr

	Controlled Emission Factor (lb/ton)	Controlled Emissions (lb/hr)	Controlled Emissions (ton/yr)	Uncontrolled Emissions (lb/hr)	Uncontrolled Emissions (ton/yr)
PM	0.27	6.885	30.2	45.90	201.0
PM10	0.27	6.885	30.2	45.90	201.0
PM2.5	0.27	6.885	30.2	45.90	201.0

Methodology:

Controlled emission Factor from AP-42, Table 9.9.7-1
Controlled Emissions (ton/yr) = Usage (ton/yr) x EF (lb/ton) x 8,760 hr/yr / 2,000 lb/ton
Uncontrolled emissions estimated based on an 85% control efficiency for controlled emissions.
PM2.5 emissions conservatively assumed to be equal to PM10 emissions.

VOC Emissions from the Dryers

Dryer Feed Rate (ton/hr)	Water Content (% by wt)	VOC Content of Water (lb VOC/lb water)	Potential VOC from Dryers (lb/hr)	Potential VOCs from Dryers (ton/yr)
25.5	66.66%	0.006	204.0	893.4

Methodology

Potential VOC Emissions from Dryers (lb/hr) = Dryer Feed Rate (25.5 ton/hr) x Water Content of Feed (% by wt) x (lb VOC/lb water) x (2000 lb/1 ton)
Potential VOC Emissions from Dryers (ton/yr) = Potential VOC Emissions from Dryers (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)

HAP Emissions from the Dryers

HAP	HAP % (by wt of VOC)	Potential HAP from Dryers (lb/hr)	Potential HAP from Dryers (ton/yr)
Acetaldehyde	6.18%	12.61	55.24
Acrolein	0.37%	0.75	3.28
Methanol	1.24%	2.52	11.05
Formaldehyde	0.04%	0.07	0.32
Total			**69.9**

Note: HAP emission rates based on performance tests at similar facilities.

Methodololgy

Potential HAP Emissions from Dryers (lb/hr) = Potential VOC emissions from dryer (lb/hr) x HAP % by wt of VOC
Potential HAP Emissions from Dryers (ton/yr) = Potential HAP Emissions from Dryers (lb/hr) x (8760 hr/yr) x (1 ton/2000 lb)

EU-41 through EU-43, EU-45, EU-61 Tanks and Bottling Operations

Source
EU-41 (Wine Room)
EU-42 (Tank Farm)
EU-43 (Bldg 88)
EU-45 (Mini Tank Farm)
EU-61 (Whiskey System)
EU-61 (Gin System)
Total

Methodology:

From Permit No. 24407: Emission Factors based on source estimates. No AP-42 or FIRE emission factors are available

Emissions (ton/yr) = Maximum usage (pg/yr)/1,000 x EF (lb/1,000 gal) / 2,000 lb/ton

Emissions (lb/hr) = Emissions (ton/yr) x 2,000 lb/ton / 8,760 hr/yr

EU-71 through EU-76 Warehouse Emissions

Source
EU-71 through EU-76

Methodology:

Emission factor taken from AP-42 Table 9.12.3-1

Emissions (ton/yr) = # barrels x EF (lb/barrel/yr) / 2,000 lb/ton

Appendix A: Emissions Calculations
Summary of Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Maximum Usage (PG/yr)	VOC Emission Factor (lb/1000 gal)	VOC Emissions (lb/hr)	VOC Emissions (ton/yr)
32,000,000	1.22	4.46	19.5
30,000,000	1.27	4.34	19.0
14,000,000	0.67	1.07	4.69
10,000,000	0.718	0.82	3.59
13,000,000	0.95	1.41	6.18
12,775,000	0.913	1.33	5.83
		13.43	**58.8**

Emission Factor (lb/barrel/yr)	# Barrels	VOC Emissions (lb/yr)	VOC Emissions (ton/yr)
6.9	541278	3,734,818	1,867

Appendix A: Emissions Calculations
Rail Car and Truck Loading Emissions.

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

EU-46 Rail Car and Truck Loading Emissions

Emission Point	Loading Properties[a]				Throughput[b]
	Loading Temperature (F)	Loading Temperature (R)	Vapor Pressure (psi)	Vapor Molecular Weight (lb/lb-mol)	Annual (1,000 gal/yr)
Rail Car and Truck Loading	62	521.67	0.689	46	29,450

Emission Point	Saturation Factor[c]	Loading Loss[d] ($lb/10^3$ gal)	Uncontrolled VOC Emmissions[e]
			Annual (ton/yr)
Rail Car and Truck Loading	0.6	0.454	6.69
Total			6.69

Methodology:

(a) Vapor pressure and molecular weight taken from the material property information for ethanol.
Antoine's Coefficients for ethanol: log P = A - [B/(T+C)]; P in bar, T in K

A =	5.37229	
B =	1670.409	
C =	-40.191	
T =	289.667	K
P =	0.047	bar
P =	0.689	psi

(b) Maximum annual production of: 31,000,000 gal/yr
Product proof: 190 proof
Product Ethanol concentration: 95%
Maximum annual Ethanol throughput: 29,450,000 gal/yr

(c) Saturation factor for submerged, dedicated loading taken from Section 5.2 of AP-42, Fifth Edition, Volume 1.

(d) Loading loss estimate calculated according to the methodology in Section 5.2 of AP-42, Fifth Edition, Volume 1.
Sample Calculation, average loading loss:
L_L ($lb/10^3$ gal)= 12.46 SMP / T ; S = Saturation Factor (--)
M = Vapor Molecular Weight (lb/lb-mol)
P = Vapor Pressure (psi)
T = Loading Temperature (R)

$$L_L = \frac{(12.46)\ (0.6)\ (46\ lb/lb\text{-}mol)\ (0.689\ psi)}{521.67\ R} = 0.454\ lb / 10^3\ gal$$

(e) Emissions estimated by applying the loading loss to the applicable loading throughput.
sample calculation, annual emissions:

	A	B	C	D	E	F	G	H
49			0.454 lb	29,450 x1,000 gal	ton	=	6.69	ton
50			1000 gal	yr	2,000 lb			yr
51								
52								

53	HAP	Product	HAP Fraction	Uncontrolled PTE HAP (ton/yr)
54	Acetaldehyde [1]	ethanol	1.00E-03	6.69E-03
55	Methanol [2]	ethanol	5.00E-03	3.34E-02
56	Formaldehyde [1]	ethanol	1.00E-03	6.69E-03
57	**Total**			**4.68E-02**

58 1. Acetaldehyde and Formaldehyde are estimated to be at trace levels in ethanol. It will conservatively assume that these trace levels do not exceed 1000 ppm in the ethanol product.

59 2. Methanol concentration is based on maximum weight percent of 0.5% as per ASTM D

60 Note: HAP emission rates based on performance tests at similar facilities.

Appendix A: Emissions Calculations

Equipmnet Leak Fugitive Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

EU-81 Equipment Leak Fugitive Emissions

Component	Count	Emission Factor (lb/hr/component)	% VOC	VOC Emissions (lb/hr)	VOC Emissions (ton/yr)
Pumps	124	0.0439	60%	3.27	14.31
Valves	4,481	0.0089	60%	23.93	104.81
Flanges	6,940	0.0005	60%	2.08	9.12
			Total	**29.28**	**128.23**

Methodology:

Component counts based on facility estimates. Counts exclude components within former bottling operation that are no longer owned or operated by MGPI of Indiana, LLC.
Average SOCMI emission factor, taken from "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017, November 1995
Emissions (lb/hr) = # components x EF (lb/hr/component) x % VOC
Emissions (ton/yr) = Emissions (lb/hr) x 8,760 hr/yr / 2,000 lb/ton

Total Fugitive VOCs (ton/yr) **128.23**

HAP	HAP Fraction	Fugitive HAP Emissions (tons/yr)
Acetaldehyde [1]	1.00E-03	1.28E-01
Methanol [2]	5.00E-03	6.41E-01
Formaldehyde [1]	1.00E-03	1.28E-01
Total		**0.90**

1. Acetaldehyde and Formaldehyde are estimated to be at trace levels in ethanol. It is conservatively assume that these trace levels do not exceed 1000 ppm in the ethanol product
2. Methanol concentration is based on maximum weight percent of 0.5% as per ASTM D 4806

Fugitive HAP Emissions (tons/yr) = VOC (tons/yr) x HAP Fraction

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Appendix A: Emission Calculations
Natural Gas Combustion Only
MMBTU/HR >100
Utility Boiler

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
244.0	2095.5

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/	1.9	7.6	7.6	0.6	280.0 **see below	5.5	84.0
Potential Emission in	1.99	7.96	7.96	0.63	293.4	5.76	88.0

*PM emission factor is filterable PM only. PM10 emission factor is condensable and filterable PM10 combined.
PM2.5 emission factor is condensable and filterable PM2.5 combined.
Emission Factors for NOx: Uncontrolled = 280 (pre-NSPS) or 190 (post-NSPS), Low NOx Burner = 140, Flue gas recirculation = 100 (See Table 1.4-1)

Methodology
All emission factors are based on normal firi
MMBtu = 1,020,000 E
MMCF = 1,000,000 Cut

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020 I
Emission Factors from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, and 1.4-3, SCC #1-01-006-01, 1·
(AP-42 Supplement D 3
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb

Appendix A: Emission Calculations
Natural Gas Combustion Only
MMBTU/HR >100
Utility Boiler

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

	HAPs - Organics				
	Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene
Emission Factor in lb/	2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03
Potential Emission in	2.20E-03	1.26E-03	7.86E-02	1.89E+00	3.56E-03

	HAPs - Metals				
	Lead	Cadmium	Chromium	Manganese	Nickel
Emission Factor in lb/	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03
Potential Emission in	5.24E-04	1.15E-03	1.47E-03	3.98E-04	2.20E-03

Total HAPs	**1.98**
Worst HAP	**1.89**

The five highest organic and metal HAPs emission factors are provided above.
Additional HAPs emission factors are available in AP-42, Chapter 1.4.

Appendix A: Emission Calculations
Natural Gas Combustion Only
MMBTU/HR >100
Utility Boiler

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

	Greenhouse Gas		
	CO2	CH4	N2O
Emission Factor in lb/	120,000	2.3	2.2
Potential Emission in	125,732	2.4	2.3

Summed Potential Emissions in tons/yr	125,736
CO2e Total in tons/yr based on 11/29/2013 federal GWPs	126,479
CO2e Total in tons/yr based on 10/30/2009 federal GWPs	126,497

Methodology

The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low Nox burner is 0.64.
Emission Factors are from AP 42, Table 1.4-2 SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03.
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential

Appendix A: Emission Calculations
Natural Gas Combustion Only
MMBTU/HR >100
Utility Boiler

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Heat Input Capacity MMBtu/hr	HHV mmBtu/mmscf	Potential Throughput MMCF/yr
47.6	1020	408.8

Unrecognized Fuel Oil usage Heat Input Capacity MMBtu/yr	HHV mmBtu/mmscf	Potential Throughput MMCF/yr
140736.0	1020	138.0

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	7.6	0.6	100 **see below	5.5	84
Potential Emission ir	0.39	1.55	1.55	0.12	20.4	1.12	17.2
Potential Emissions from Unr Fuel Oil consumption	0.13	0.52	0.52	0.04	6.90	0.38	5.80

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combine
PM2.5 emission factor is filterable and condensable PM2.5 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recircula

Methodology

	A	B	C	D	E	F	G	H	I	J
39										
40	All emission factors are based on normal firin									
41	MMBtu = 1,000,000 I									
42	MMCF = 1,000,000 Cubic Fe									
43	Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-									
44	Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,020									
45	Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb									

Appendix A: Emission Calculations
Natural Gas Combustion Only
MMBTU/HR >100
Utility Boiler

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

HAPS Calculations

	HAPs - Organics					
	Benzene	Dichlorobenzene	Formaldehyde	Hexane	Toluene	**Total - Organics**
Emission Factor in lb	2.1E-03	1.2E-03	7.5E-02	1.8E+00	3.4E-03	
Potential Emission in	4.292E-04	2.453E-04	1.533E-02	3.679E-01	6.950E-04	**3.846E-01**

	HAPs - Metals					
	Lead	Cadmium	Chromium	Manganese	Nickel	**Total - Metals**
Emission Factor in lb	5.0E-04	1.1E-03	1.4E-03	3.8E-04	2.1E-03	
Potential Emission in	1.022E-04	2.248E-04	2.862E-04	7.767E-05	4.292E-04	**1.120E-03**

Total HAPs	**3.857E-01**
Worst HAP	**3.679E-01**

Methodology is the same as a

The five highest organic and metal HAPs emission factors are provided above.
Additional HAPs emission factors are available in AP-42, Chapt

Appendix A: Emission Calculations
Natural Gas Combustion Only
MMBTU/HR >100
Utility Boiler

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Greenhouse Gas Calculations

	Greenhouse Gas		
	CO2	CH4	N2O
Emission Factor in lb	120,000	2.3	2.2
Potential Emission in	24,528	0.5	0.4
Summed Potential Emissions in tons/yr		24,529	
CO2e Total in tons/yr based on 11/29/2013 federal GWPs		24,674	
CO2e Total in tons/yr based on 10/30/2009 federal GWPs		24,677	

Methodology

The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low Nox burner is 0.64.
Emission Factors are from AP 42, Table 1.4-2 SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03.
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton
CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential
CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential

Appendix A: Emissions Calculations
Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)
#1 and #2 Fuel Oil

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Heat Input Capacity MMBtu/hr	Potential Throughput kgals/year	Limited Throughput kgals/yr	S = Weight %
			0.3
45.6	2853.3	1848	

Unrecognized Fuel Oil usage (kgals/year)	Unrecognized Heat Input Capacity MMBtu/yr
1005.3	140736.0

	Pollutant						
	PM*	PM10	direct PM2.5	SO2	NOx	VOC	CO
Emission Factor in lb/kgal	2.0	2.3	1.55	42.6 *(142.0S)*	20.0	0.20	5.0
Potential Emission in tons/yr	2.85	3.28	2.21	60.8	28.5	0.29	7.1
Limited Emissions from fuel oil in tons/yr	1.85	2.13	1.43	39.4	18.5	0.185	4.62

Methodology

1 gallon of No. 2 Fuel Oil has a heating value of 140,000 Btu

Potential Throughput (kgals/year) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1kgal per 1000 gallon x 1 gal per 0.140 MM Btu

Emission Factors are from AP 42, Tables 1.3-1, 1.3-2, 1.3-3 and 1.3-6 (SCC 1-02-005-01/02/03) Supplement E 9/98 (see erata file)
*PM emission factor is filterable PM only. Condensable PM emission factor is 1.3 lb/kgal.
Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton

Appendix A: Emissions Calculations
Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)
#1 and #2 Fuel Oil

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

	HAPs - Metals				
	Arsenic	Beryllium	Cadmium	Chromium	Lead
Emission Factor in lb/mmBtu	4.0E-06	3.0E-06	3.0E-06	3.0E-06	9.0E-06
Potential Emission in tons/yr	7.99E-04	5.99E-04	5.99E-04	5.99E-04	1.80E-03

	HAPs - Metals (continued)				
	Mercury	Manganese	Nickel	Selenium	
Emission Factor in lb/mmBtu	3.0E-06	6.0E-06	3.0E-06	1.5E-05	
Potential Emission in tons/yr	5.99E-04	1.20E-03	5.99E-04	3.00E-03	Total 9.8E-03

Methodology

No data was available in AP-42 for organic HAPs.
Potential Emissions (tons/year) = Throughput (mmBtu/hr)*Emission Factor (lb/mmBtu)*8,760 hrs/yr / 2,000 lb/ton

Appendix A: Emissions Calculations

Commercial/Institutional/Residential Combustors (< 100 mmBtu/hr)

#1 and #2 Fuel Oil

Greenhouse Gas Emissions

Company Name: MGPI of Indiana, LLC
Address: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Part 70 Operating Permit No.: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

	Greenhouse Gas		
	CO2	CH4	N2O
Emission Factor in lb/kgal	22,300	0.052	0.26
Potential Emission in tons/yr	31,814	0.1	0.4
Summed Potential Emissions in tons/yr	31,814		
CO2e Total in tons/yr based on 11/29/2013 federal GWPs	31,926		
CO2e Total in tons/yr based on 10/30/2009 federal GWPs	31,930		

Methodology

The CO2 Emission Factor for #1 Fuel Oil is 21500. The CO2 Emission Factor for #2 Fuel Oil is 22300.

Emission Factors are from AP 42, Tables 1.3-3, 1.3-8, and 1.3-12 (SCC 1-02-005-01/02/03) Supplement E 9/99 (see erata file)

Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.

Emission (tons/yr) = Throughput (kgals/ yr) x Emission Factor (lb/kgal)/2,000 lb/ton

CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298)

CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (21) + N2O Potential Emission ton/yr x N2O GWP (310)

Appendix A: Emission Calculations
Large Reciprocating Internal Combustion Engines - Diesel Fuel
Output Rating (>600 HP)
Maximum Input Rate (>4.2 MMBtu/hr)

Company Name: MGPI of Indiana, LLC
Address City IN Zip: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Permit Number: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

B. Emissions calculated based on output rating (hp)

Output Horsepower Rating (hp)	1600.0
Maximum Hours Operated per Year	500
Potential Throughput (hp-hr/yr)	800,000
Sulfur Content (S) of Fuel (% by weight)	0.500

	Pollutant						
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC	CO
Emission Factor in lb/hp-hr	7.00E-04	4.01E-04	4.01E-04	4.05E-03 *(.00809S)*	2.40E-02 **see below	7.05E-04	5.50E-03
Potential Emission in tons/yr	0.28	0.16	0.16	1.62	9.60	0.28	2.20

*PM10 emission factor in lb/hp-hr was calculated using the emission factor in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

**NOx emission factor: uncontrolled = 0.024 lb/hp-hr, controlled by ignition timing retard = 0.013 lb/hp-hr

Hazardous Air Pollutants (HAPs)

	Pollutant						
	Benzene	Toluene	Xylene	Formaldehyde	Acetaldehyde	Acrolein	Total PAH HAPs***
Emission Factor in lb/hp-hr****	5.43E-06	1.97E-06	1.35E-06	5.52E-07	1.76E-07	5.52E-08	1.48E-06
Potential Emission in tons/yr	2.17E-03	7.87E-04	5.40E-04	2.21E-04	7.06E-05	2.21E-05	5.94E-04

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)

****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

Potential Emission of Total HAPs (tons/yr)	**4.41E-03**

Green House Gas Emissions (GHG)

	Pollutant		
	CO2	CH4	N2O
Emission Factor in lb/hp-hr	1.15E+00	4.62E-05	9.24E-06
Potential Emission in tons/yr	4.60E+02	1.85E-02	3.70E-03

Summed Potential Emissions in tons/yr	**4.60E+02**
CO2e Total in tons/yr based on 11/29/2013 federal GWPs	**4.62E+02**
CO2e Total in tons/yr based on 10/30/2009 federal GWPs	**4.62E+02**

Emission Factors are from AP 42 (Supplement B 10/96) Tables 3.4-1 , 3.4-2, 3.4-3, and 3.4-4.
CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.
Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.

	A	B	C	D	E	F	G	H	I	J
53	Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]									
54	Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]									
55	CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).									
56	CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (21) + N2O Potential Emission ton/yr x N2O GWP (310).									

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Appendix A: Emission Calculations
Reciprocating Internal Combustion Engines - Natural Gas
2-Stroke Lean-Burn (2SLB) Engines

Company Name: MGPI of Indiana, LLC
Address City IN Zip: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Permit Number: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

Maximum Heat Input Capacity (MMBtu/hr)	0.121
Maximum Hours Operated per Year (hr/yr)	500
Potential Fuel Usage (MMBtu/yr)	60.5
High Heat Value (MMBtu/MMscf)	1020
Potential Fuel Usage (MMcf/yr)	0.06

	Pollutant						
Criteria Pollutants	PM*	PM10*	PM2.5*	SO2	NOx	VOC	CO
Emission Factor (lb/MMBtu)	3.84E-02	4.83E-02	4.83E-02	5.88E-04	3.17E+00	1.20E-01	3.86E-01
Potential Emissions (tons/yr)	0.001	0.001	0.001	1.78E-05	0.10	0.004	0.01

*PM emission factor is for filterable PM-10. PM10 emission factor is filterable PM10 + condensable PM.
PM2.5 emission factor is filterable PM2.5 + condensable PM.

Hazardous Air Pollutants (HAPs)

Pollutant	Emission Factor (lb/MMBtu)	Potential Emissions (tons/yr)
Acetaldehyde	7.76E-03	2.35E-04
Acrolein	7.78E-03	2.35E-04
Benzene	1.94E-03	5.87E-05
1,3-Butadiene	8.20E-04	2.48E-05
Ethylbenzene	1.08E-04	3.27E-06
Formaldehyde	5.52E-02	1.67E-03
Methanol	2.48E-03	7.50E-05
Methylene Chloride	1.47E-04	4.45E-06
Hexane	4.45E-04	1.35E-05
Toluene	9.63E-04	2.91E-05
2,2,4-Trimethylpentane	8.46E-04	2.56E-05
Total PAH**	1.34E-04	4.05E-06
	Total	**2.38E-03**

**PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)

Methodology
Emission Factors are from AP-42 (Supplement F, July 2000), Table 3.2-1
Potential Fuel Usage (MMBtu/yr) = [Maximum Heat Input Capacity (MMBtu/hr)] * [Maximum Hours Operating per Year (hr/yr)]
Potential Emissions (tons/yr) = [Potential Fuel Usage (MMBtu/yr)] * [Emission Factor (lb/MMBtu)] / [2000 lb/ton]

	Greenhouse Gas (GHG)		
Greenhouse Gases (GHGs)	CO2	CH4	N2O
Emission Factor in lb/MMBtu*	110	1.25	
Emission Factor in lb/MMcf**			2.2
Potential Emission in tons/yr	3.33	0.04	0.00
Summed Potential Emissions in tons/yr	3.37		

	A	B	C	D	E	F	G	H	I	J	K	L
55												
56	CO2e Total in tons/yr based on 11/29/2013				4.29							
57	federal GWPs											
58												
59	CO2e Total in tons/yr based on 10/30/2009				4.14							
60	federal GWPs											
61												
62	**Methodology**											
63	*The CO2 and CH4 emission factors are from Emission Factors are from AP-42 (Supplement F, July 2000), Table 3.2-2											
64	**The N2O emission factor is from AP 42, Table 1.4-2. The N2O Emission Factor for uncontrolled is 2.2. The N2O Emission Factor for low Nox burner is 0.64.											
65	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.											
66	For CO2 and CH4: Emission (tons/yr) = [Potential Fuel Usage (MMBtu/yr)] * [Emission Factor (lb/MMBtu)] / [2,000 lb/ton]											
67	For N2O: Emission (tons/yr) = [Potential Fuel Usage (MMCF/yr)] * [Emission Factor (lb/MMCF)] / [2,000 lb/ton]											
68	CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).											
69	CO2e (tons/yr) based on 10/30/2009 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (21) + N2O Potential Emission ton/yr x N2O GWP (310).											
70												
71	**Abbreviations**											
72	PM = Particulate Matter		NOx = Nitrous Oxides				CO2 = Cabon Dioxide					
73	PM10 = Particulate Matter (<10 um)		VOC - Volatile Organic Compounds				CH4 = Methane					
74	SO2 = Sulfur Dioxide		CO = Carbon Monoxide				N2O = Nitrous Oxide					
75							CO2e = CO2 equivalent emissions					

Appendix A: Emission Calculations
Reciprocating Internal Combustion Engines - Diesel Fuel
Output Rating (<=600 HP)
Maximum Input Rate (<=4.2 MMBtu/hr)

Company Name: MGPI of Indiana, LLC
Address City IN Zip: 7 Ridge Avenue, Lawrenceburg, Indiana 47025
Permit Number: T029-32119-00005
Reviewer: Teresa Freeman / Kristen Willoughby
Date: May 22, 2014

B. Emissions calculated based on output rating (hp)

Output Horsepower Rating (hp)	235.0
Maximum Hours Operated per Year	500
Potential Throughput (hp-hr/yr)	117,500
Sulfur Content (S) of Fuel (% by weight)	0.500

	Pollutant					
	PM*	PM10*	direct PM2.5*	SO2	NOx	VOC
Emission Factor in lb/hp-hr	2.20E-03	2.20E-03	2.20E-03	2.05E-03	3.10E-02	2.51E-03
Potential Emission in tons/yr	0.13	0.13	0.13	0.12	1.82	0.15

*PM10 emission factor in lb/hp-hr was calculated using the emission factor in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).
**NOx emission factor: uncontrolled = 0.024 lb/hp-hr, controlled by ignition timing retard = 0.013 lb/hp-hr

Hazardous Air Pollutants (HAPs)

	Pollutant					
	Benzene	Toluene	Xylene	1,3-Butadiene	Formaldehyde	Acetaldehyde
Emission Factor in lb/hp-hr****	6.53E-06	2.86E-06	2.00E-06	2.74E-07	8.26E-06	5.37E-06
Potential Emission in tons/yr	3.84E-04	1.68E-04	1.17E-04	1.61E-05	4.85E-04	3.15E-04

***PAH = Polyaromatic Hydrocarbon (PAHs are considered HAPs, since they are considered Polycyclic Organic Matter)
****Emission factors in lb/hp-hr were calculated using emission factors in lb/MMBtu and a brake specific fuel consumption of 7,000 Btu / hp-hr (AP-42 Table 3.3-1).

Potential Emission of Total HAPs (tons/yr)

Green House Gas Emissions (GHG)

	Pollutant		
	CO2	CH4	N2O
Emission Factor in lb/hp-hr	1.15E+00	4.62E-05	9.24E-06
Potential Emission in tons/yr	6.76E+01	2.71E-03	5.43E-04

	Summed Potential Emissions in tons/yr

	A	B	C	D	E	F	G	H
50	**Methodology**							
51	Emission Factors are from AP42 (Supplement B 10/96), Tables 3.3-1 and 3.3-2							
52	CH4 and N2O Emission Factor from 40 CFR 98 Subpart C Table C-2.							
53	Global Warming Potentials (GWP) from Table A-1 of 40 CFR Part 98 Subpart A.							
54	Potential Throughput (hp-hr/yr) = [Output Horsepower Rating (hp)] * [Maximum Hours Operated per Year]							
55	Potential Emission (tons/yr) = [Potential Throughput (hp-hr/yr)] * [Emission Factor (lb/hp-hr)] / [2,000 lb/ton]							
56	CO2e (tons/yr) based on 11/29/2013 federal GWPs= CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (25) + N2O Potential Emission ton/yr x N2O GWP (298).							
57	CO2e (tons/yr) based on 10/30/2009 federal GWPs = CO2 Potential Emission ton/yr x CO2 GWP (1) + CH4 Potential Emission ton/yr x CH4 GWP (21) + N2O Potential Emission ton/yr x N2O GWP (310).							

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21	6.68E-03	
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30		Total PAH
31	Acrolein	HAPs***
32	6.48E-07	1.18E-06
33	3.80E-05	6.91E-05
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38	**1.59E-03**	
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46	**6.76E+01**	
47	**CO2e Total in tons/yr based on 11/29/2013 federal GWPs**	**6.78E+01**
48	**CO2e Total in tons/yr based on 10/30/2009 federal GWPs**	**6.78E+01**
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